F61: Nuclear Magnetic Resonance

Paris J. Huth & Q'inich Figueroa

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Abstract

In the experiment we study properties and usages of nuclear magnetic resonance (NMR). Firstly we measure the characteristic relaxation times T_1 and T_2. This later was estimated with the Hahn echo and Carr-Purcell sequence. Both methods are compared. Secondly we used NMR to identify substances using with help of the characteristic chemical shift using TMS as reference substance. Lastly NRM was used for 1 dimensional and 2 dimensional imaging.

1 Results

1.1 Relaxation time

The measured relaxation times are to be seen in table 1

Table 1: Relaxation times for Gd500 and Gd600

Probe	spin-spin T_2 [ms]			spin-lattice T_1[ms]
	spin-echo	Carr-Purcell	deviation *sigma*	
Gd 500	110,1 ± 1,6	111,3 ± 1,5	0,5	159 ± 1,3
Gd 600	115,7 ± 1,2	116,9 ± 0,9	0,8	154,4 ± 1,2

1.2 Chemical shift

1.2.1 Imaging

1 dimensional imaging

Time evolution of system

2 dimensional imaging

2 Critical Discussion